

A NEW SPECIES OF FORESTER MOTH FROM VICTORIA (LEPIDOPTERA: ZYGAENIDAE: PROCRIDINAE)

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Abstract

A new species of forester moth, *Pollanisus marriotti* sp. n., is described from Victoria. It is similar to *Pollanisus angustifrons* Tarmann, 2004 and several closely related species from northern Queensland but distinguishable by its size, the breadth of its head and by the structure of the antennae. *Pollanisus marriotti* sp. n. is currently known from a single locality in the vicinity of Gembrook, east of Melbourne, where it occurs together with *Pollanisus lithopastus* Turner, 1926, from which it can be readily distinguished by the coloration of the abdomen and the size of the head and compound eyes.

Introduction

The Zygaenidae of Australia were revised recently by Tarmann (2004). The most speciose genus is the Australian endemic *Pollanisus* Walker, with currently 20 species described. *Pollanisus* species are distributed mainly along the eastern and south-eastern coast of Australia and Tasmania, with relatively few species occurring in South and Western Australia.

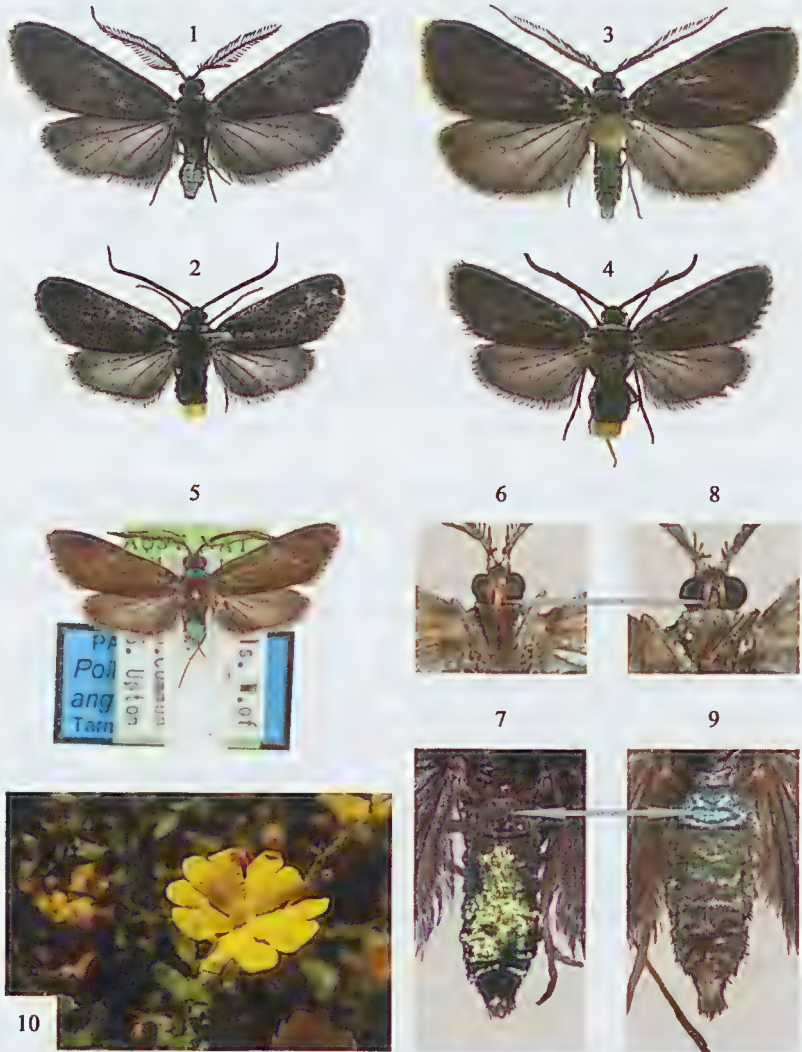
Despite Tarmann's (2004) revision, a relatively large number of species remain unnamed due to the lack of sufficient material. This is especially true in the case of *Pollanisus* from the northern part of the genus' range. The species from south-eastern Australia, in particular from Victoria and southern New South Wales, however, have been collected extensively and can be considered well-known; the discovery of a previously unknown species of *Pollanisus* in the vicinity of Melbourne therefore came as a surprise. This new species belongs to a group of species known previously only from the tropical and sub-tropical north-east of Australia, and is clearly distinct from all other species that occur in Victoria or New South Wales.

Methods

The terminology of the setal combination of the first abdominal segment of the first instar larvae follows Efetov *et al.* (2000) and describes the position, number and colour of setae. Abbreviations used in the description as are follows: D (dorsal), SD (subdorsal), L (lateral), *l* (light), *d* (dark).

Material

The acronyms of the following depositories are given in parentheses: ANIC - Australian National Insect Collection, CSIRO Entomology, Canberra, Australia; CAKM - Collection of Axel Kallies, Melbourne, Australia; CBMG - Collection of Bernard Mollet, Gif-sur-Yvette, France.



Figs 1-10. *Pollanisus* spp. and host plant. (1-2) *P. marriotti* sp. n.: (1) male (holotype), dorsal; (2) female (paratype), dorsal. (3-4) *P. lithopastus*: (3) male, dorsal; (4) female, dorsal. (5) *P. angustifrons* (paratype) male, dorsal. (6-7) *P. marriotti* sp. n., male: (6) head, ventral; (7) abdomen, dorsal. (8-9) *P. lithopastus*, male: (8) head, ventral; (9) abdomen, dorsal. (10) *Hibbertia empetrifolia* (DC.) Hoogland, the assumed host plant of *P. marriotti* sp. n. at the type locality, Gilwell Park, Gembrook, Victoria.

Pollanisus marriotti sp. n.

(Figs 1, 2, 6, 7, 11-15)

Types. Holotype ♂ (Fig. 1): 'Australia, Victoria, E of Melbourne, Gembrook, Gilwell Park, S37°26' E145°39', 3.ii.2008, lux, leg. A. Kallies & P. Marriott' (to be deposited in ANIC). *Paratypes*: 1 ♂, same data as holotype but 10.i.2008 (P. Marriott) (CAKM); 2 ♂♂, 1 ♀ (GP698), same data as holotype but 3.ii.2008 (A. Kallies & P. Marriott) (CBMG); 2 ♂♂, 1 ♀, same data as holotype but 6.ii.2009 (A. Kallies & A. Young) (CAKM); 2 ♂♂, same data as holotype but 27.i.2009 (A. Kallies, S. & B. Mollet) (CBMG); 4 ♂♂ (GP697), 1 ♀ (Fig. 2), same data as holotype but 8.ii.2009 (A. Kallies, S. & B. Mollet) (CBMG); 1 ♀, same data as holotype but 7.ii.2009 (M. Vagg) (CAKM); 3 ♂♂, same data as holotype but 2.ii.2010 (A. Kallies, P. Marriott & M. Hewish) (CAKM); 1 ♂, same data as holotype but 21.ii.2010 (A. Kallies) (CAKM).

Etymology

marriotti – a noun in the genitive case: this new species is dedicated to Peter Marriott, Bentleigh, Victoria, main author of the 'Moths of Victoria' book series, who collected the first specimen.

Description

Male (Fig. 1). Forewing length: 8.5-9.5 mm. Head dorsally dark brown with a bluish green sheen, with metallic green frontal scales and a narrow stripe of shiny bluish green scales running along the margin of the black compound eye; frons *ca* 1.2 x broader than breath of compound eye in frontal view, significantly protruding beyond compound eyes in both lateral and dorsal view; labial palps light brown without metallic scales; proboscis yellow to light brown; distance of ocellus from compound eye 0.8 x diameter of ocellus; chaetosemata dark brown, the anterior extension overreaching ocellus and completely covering the space between compound eye and ocellus. Antenna dark brown with a weak bluish green sheen on dorsal side of the shaft; segments 1 to 29-31 bipectinate, segments 30-32 to 39-42 biserrate; at segment 15 pectination 6-6.5 x longer than breath of shaft in dorsal view and 4-4.5 x longer at segment 25; sensory hairs on pecten very short. Collar with bright metallic golden green scales.

Thorax dark brown with a weak bluish green sheen dorsally and with shiny metallic bluish green scales laterally and ventrally; patagia dark brown with golden green scales proximally. Legs dark brown, femur of hind leg metallic green blue laterally. Abdomen dark brown on the first segment and mostly metallic golden green dorsally on other segments, dark brown with a very weak bluish green sheen ventrally.

Wings broad, forewing elongate triangular, hindwing almost rectangular, rounded apically, posterior margin straight; forewing upperside dark brown with a weak bluish green sheen and a patch of green metallic scales near the cell (on fresh specimens); underside dark grey-brown without metallic scales; hindwing upperside dark brown with a slightly translucent space between

veins CuP and Cu2; underside dark brownish grey with metallic bluish green scales in a band between cell and costa and at anal angle. Fringe blackish brown with a weak sheen.

Female (Fig. 2). Forewing length: 7-7.5 mm. Similar to male but with narrower and more rounded wings. Antenna biserrate. Abdominal hair tuft bright yellow.

Male genitalia (Figs 11-12). Valva pointed distally, slightly convex dorsally, folded translucent central part triangular, ventral sclerotization broad, ventral margin of valva straight with a proximal part lobed, saccus strongly sclerotized. Aedeagus slightly tapered and upcurved, *ca* 4.5 x longer than broad; cornutus large and slender, straight, pointed distally, its length *ca* 80% of aedeagus.

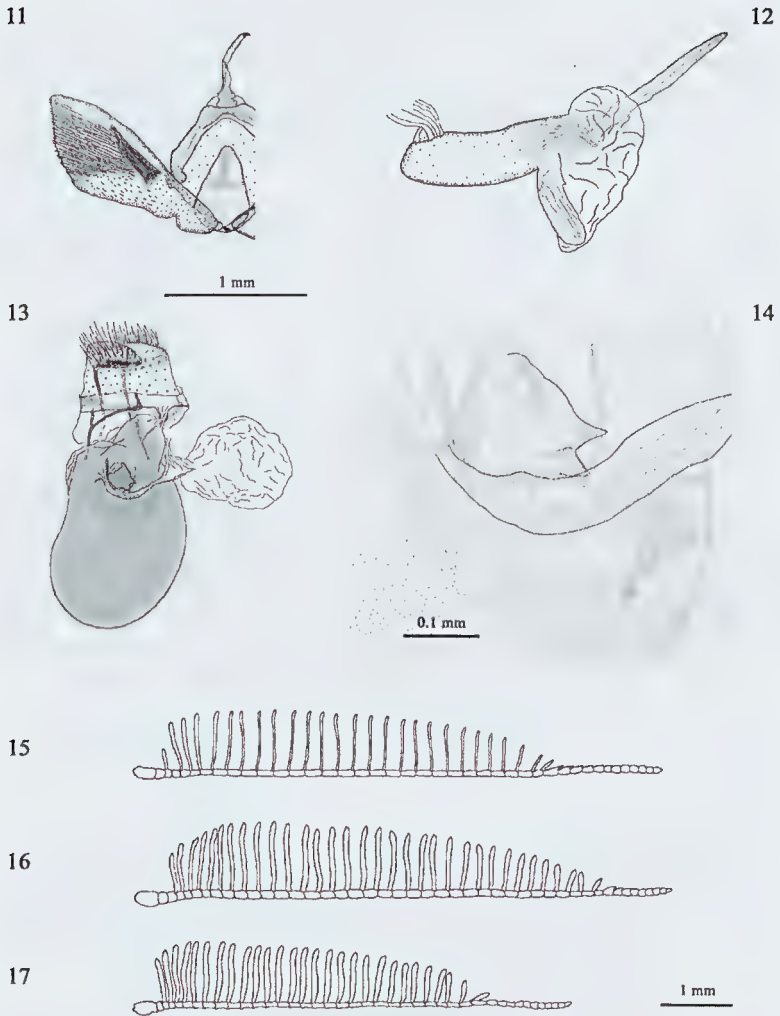
Female genitalia (Figs 13-14). Sternite VIII not sclerotized, ductus bursae short, translucent, wall of corpus bursae near point of insertion of ductus bursae with a sclerotization bearing 2 small teeth. Ductus seminalis arising near lumen of corpus bursae.

Description of the first instar larva

The L1 (first instar) is cream coloured and about 1 mm in length. It has a combination of three anal combs, an arrangement known for the genus *Pollanisus* and other genera of the tribe Artonini (Mollet and Tarmann 2010). There are no brown lateral spots on the subdorsal part of the third thoracic segment and on the second and fifth abdominal segments visible. The setal formula of the first abdominal segment is: D: 1*d*; SD: 1*d*, 1*l*; L: 2*l*. This appears characteristic of the Artonini (Mollet and Tarmann 2010).

Diagnosis

Pollanisus marriotti sp. n. is similar and appears to be most closely related to *P. angustifrons* Tarmann, 2004, *P. eungellae* Tarmann, 2004, *P. eumetopus* Turner, 1926, *P. acharon* (Fabricius, 1775) and a number of unnamed species, all of which occur in the northern parts of Queensland and the Northern Territory. These all belong to a group of species characterized by their dark brown forewings with sparse metallic scales, their bright metallic green collar and a conspicuous green metallic mark that gradually widens from a point at the centre of the 2nd tergite and covers most of the caudal part of the abdomen. Within this group, *P. marriotti* sp. n. is remarkable in that it occurs outside of the tropics in temperate sclerophyll forest in Victoria. *P. marriotti* sp. n. can be distinguished from all other species of the group by its relatively wider wings and larger size. In particular, *P. angustifrons* (Fig. 5) is smaller, has a wider head, more extended pectination of the antennae (Fig. 17) and the forewings are relatively narrower. *Pollanisus eungellae*, *P. eumetopus* and *P. acharon* are smaller and their forewings are relatively narrower; *P. eungellae* and *P. eumetopus* have a broader frons.



Figs 11-17. *Pollanisus* spp. (11-14) *P. marriotti* sp. n., genitalia: (11) ventral view of male genitalia, aedeagus removed, left valve omitted; (12) aedeagus; (13) overview of female genitalia, praebursa with spermatophore; (14) sclerotization at insertion of ductus seminalis. (15-17) *Pollanisus* spp., male antenna with shaft, pectination on only one side shown: (15) *P. marriotti* sp. n.; (16) *P. lithopastus*; (17) *P. angustifrons*.

Pollanisus marriotti sp. n. also shows similarities to *P. subdolosa* (Walker, [1865]) and some related species. With these it shares the general morphology such as wing and body shape and the distribution of metallic scales on the abdomen. However, *P. subdolosa* and related species can be readily distinguished by the colour of its abdomen and collar, which are metallic copper-red, but never metallic green. Females of *P. subdolosa* also differ by the lack of metallic scales on the abdomen, which are always present in *P. marriotti* sp. n., by their relatively larger yellow anal tuft and by their somewhat narrower wings. *P. subdolosa* has not been found at the type locality of *P. marriotti* sp. n.; however, it occurs in other forests in the vicinity of Melbourne and other parts of southern Victoria and is also attracted to light. Furthermore, *P. subdolosa* has two generations per year with adults being on the wing in November and December and again in March, whereas *P. marriotti* sp. n. occurs only in a single generation in summer.

Superficially, *P. marriotti* sp. n. is also similar to *P. lithopastus* Turner, 1926 (Figs 3-4) and both species occur syntopically at the type locality. *P. marriotti* sp. n. differs from *P. lithopastus* as follows: head narrower, eyes smaller and proboscis yellow (Fig. 6) (head wider, eyes larger and proboscis dark brown in *P. lithopastus*, Fig. 8); dorsal side of the 1st abdominal segment without metallic scales, with a conspicuous green metallic mark that gradually widens from a point at the centre of the 2nd tergite and covers most of the caudal part of the abdomen (Fig. 7) (dorsal side of abdomen completely metallic blue in *P. lithopastus*, Fig. 9); fore and hindwings narrower (broader in *P. lithopastus*); hindwings lighter (darker in *P. lithopastus*). Furthermore, the apical biserrate part of the antennae is relatively longer in *P. marriotti* sp. n. (Figs 15-17).

The new species cannot be confused with any of the other *Pollanisus* species (c.f. Tarmann 2004).

Phenology and bionomics

The only known locality of this species is a semi-dry to wet eucalypt forest at about 300 m altitude with a rich understorey of *Leptospermum*, *Banksia* and *Hibbertia*. The locality is a mosaic of slopes and wet gullies and harbours a rich lepidopterous fauna, including many species that apparently reach their most southern and western distribution limit in this area.

At the type locality, *P. marriotti* sp. n. shares its habitat with *Hestiochora furcata* Tarmann, 2004 and *P. lithopastus*, the latter being very common in this locality. The adults of *P. marriotti* sp. n. fly from early January to late February, whereas *P. lithopastus* has a longer flight period from late November to early March. Although both species are also likely to be active during the day, most specimens were observed or collected at the light between 22.00h and 24.00h. Up to 50 specimens of *P. lithopastus* were

attracted to the light on warm and dark nights and hundreds were observed over the course of the flight period, all but two being males. *P. marriotti* sp. n. is comparatively rare, with typically only a few specimens attracted to the light during one night. Despite extensive searching during the day, few specimens of *P. marriotti* sp. n. were found, two flying at about 5 pm and one male on the flowers of *Leptospermum* at about 10.00h. Despite extensive fieldwork around Melbourne by one of us (AK), *P. lithopastus* was observed only once during daytime, when a female was found resting on a grass stem in the afternoon.

The hostplant of both *P. lithopastus* and *P. marriotti* sp. n. in Gilwell Park is likely to be the Trailing Guinea-flower, *Hibbertia empetrifolia* (DC.) Hoogland (Fig. 10). Larvae that hatched from eggs obtained from females of both species started feeding on the leaves of this species. Larvae of *P. marriotti* sp. n. also accepted *Hibbertia scandens* (Willd) Dryand as a surrogate, but died subsequently, whereas the larvae of *P. lithopastus* refused this plant. *P. lithopastus* seems to utilize different *Hibbertia* species as hostplants as it can be common in places where *Hibbertia empetrifolia* is apparently absent.

Distribution

Despite recent intensive collecting around Melbourne and occasional activity in parts of Gippsland and East Gippsland, *P. marriotti* sp. n. was only found at the type locality. However, it can be assumed that other colonies of this species exist in sheltered coastal forests east of Melbourne. *P. lithopastus*, on the other hand, is relatively widespread east of Melbourne and also occurs in the Otway Ranges and near Nelson in the west of Victoria.

Conservation status

Pollanisia marriotti sp. n. is currently known only from a single locality, Gilwell Park, in the vicinity of Gembrook. This is remarkable as light trapping was frequently conducted in similar forests east of Melbourne. Whereas *P. lithopastus* was found in most of these locations, *P. marriotti* sp. n. was not. A similar distribution pattern was observed for various other moth species (Kallies and Marriott, unpublished observations). Although the reasons for the restricted distribution of these species are unknown, we speculate that lack of fire is a major factor. In an area well known for its high bushfire risk, Gilwell Park has escaped widespread fire damage for over 80 years and was not subject to 'controlled' back burning. This lack of fire may well be the key factor for the high diversity observed in this area.

Although parts of Gilwell Park are frequently used by Scouts and other groups for camping and other outdoor activities and the vegetation is controlled by regular slashing, other parts of the park are relatively undisturbed. Importantly, these activities do not seem to have obvious negative impacts on plant and insect diversity. This shows that use of forest

for recreational activities when carefully managed is fully consistent with protection of a diverse fauna and flora. It furthermore underlines the importance of woodland and forest protected from bushfires and back burning as refugia that ensure long-term survival of a diverse array not only of birds and mammals but also of butterflies, moths and other insects. Gilwell Park is a prime example of such a place. *P. marriotti* sp. n., due to its restricted distribution and its potential susceptibility to fire, should be considered a threatened species.

Acknowledgements

We would like to express our gratitude to Peter Marriott who collected and provided the first specimens of this interesting new species, to Murray Vagg who helped us with our fieldwork, and to the Gilwell Park authorities for allowing us to conduct research on their premises and for allowing us to use the facilities of the Park. We furthermore would like to thank the Victorian Department of Sustainability and Environment for providing appropriate research permits.

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